

By Eduardo Paes

# INTEGRATING EMERGENCY RESPONSE MANAGEMENT

## FOR A RESILIENT RIO

### The Challenge

In 2010, an overnight flash flood hit Rio de Janeiro, resulting in 28 centimetres of rain and 68 deaths. Approximately 15,000 people lost their homes to landslides, and a further 10,000 people were at risk of losing their homes, as the rain continued long after the initial flash flood.

The city's transport system was paralysed, with highways and bridges forced to close and, in certain areas, residents urgently needed to be evacuated. In other cases, people were asked to stay indoors until the storm passed. It was one of the worst natural disasters to hit Rio in recent history.

In part, the catastrophe was unavoidable, but the consequences of the storm might have been less severe had various city agencies had the necessary communication systems in place, in order to respond to the crisis faster and more effectively. At the time, Rio's emergency preparation was lacking. It was a painful lesson but,

as a result, the city is now prepared for almost any eventuality – planned or unplanned.

### The Solution

Following the floods, the city's immediate concern was emergency response management. As mayor, I vowed that Rio would never suffer such a tragic disaster again. With less than a year before the next rainy season, the city had to act quickly. Six weeks after the April 2010 storms, the city's planners had the technological and physical blueprint for the Rio Operations Center – an emergency management operations centre that was created in collaboration with IBM.

This was not simply a call centre and dispatch system. The groundbreaking proposal broke down traditional communication barriers between city agencies and built an operations centre where information could be centrally sourced, shared, stored and analysed.

The Rio Operations Center was integrated with IBM's weather

modelling and forecasting tool (called Deep Thunder) that employs fine-grain calculations to predict floods and landslides – and their precise locations – up to 48 hours in advance. These models, integrated with data streams and communications systems from multiple municipal agencies, would allow authorities to prepare a response before a disaster strikes, and emergency teams could be positioned ahead of time in optimal locations.

Before the centre was built, each department operated independently and was hindered by the quantity, quality and relevance of its data. Under the new system, we slashed emergency response times by 30%, which is no small feat in a city as large as Rio.

It took six months to install the core system and, once completed, it proved so effective that the city decided to take it a step further. There was no reason the Rio Operations Center should be limited to emergency management. Using innovative technologies, such as







IBM's analytics software, the city's various authorities realised that they could monitor city systems and predict potential issues before they occurred.

For example, a report of a fire on a major freeway is relevant to firefighters as well as transport departments. While firefighters travel to the scene, transportation authorities can redirect traffic to help minimise congestion. With the operations centre, the city was able to integrate data from all of its departments under a single system. Some people labelled the initiative as being "experimental" due to radical information sharing and the breaking down of departmental boundaries, something that traditional government organisations were - at that time - not used to.

Physically, the Rio Operations Center resembles a "nerve centre" - a giant screen shows maps with weather patterns and specific spots that are vulnerable to floods or landslides. A second section streams video feeds from 850 video cameras that are mostly positioned along major transportation routes around the city. Finally, the most important data available at any given time - the city's 'vital signs' - are highlighted in a third sector, which looks similar to a dashboard.

In order to get all agencies on board, the city's planners asked all 31 municipal departments to appoint one leader and staff members to work on location. They also appointed a Chief Operations Officer to oversee the entire facility.

### The Outcome

An interesting thing happened when employees from every municipal department were forced to work together under one roof. Those who might have otherwise been reluctant to cooperate with people outside of their organisation began collaborating with others naturally.

While the system does indeed work, the city has not become complacent. In fact, the city is constantly working to improve it. Recently, various algorithms were tested on historical storms and flooding to see whether the new software accurately predicted problematic areas. In cases where the algorithms were off, adjustments and modifications were made to improve their accuracy.

In November 2011, the city also conducted simulations of landslides and flood emergencies, which involved more than 100 city managers, to test technologies and coordination procedures that the

1 pg 9: Inside the Rio Operations Center, the incident commander and responders have a unified view of all the information to help them predict and prepare emergency response plans.

Photo courtesy of IBM.

2 pg 10: Close up of the giant screen. It provides a summary of everything happening around the city - surveillance cameras, maps, simulations, news updates, resources and information about incidents.

Photo courtesy of IBM.

city had put in place for emergency response.

In the event that the same flash flood that occurred two years ago were to hit Rio today, the city could not guarantee it would avoid damage. It could, however, guarantee its response to be quicker, more effective and more efficient than it ever was before.



**Eduardo Paes started his political career as the head of the Barra da Tijuca and Jacarepaguá districts in Rio de Janeiro. He then became a city councilman, President of the City Council, a congressman, the Municipal Secretary for Environment and the State Government's Secretary for Sports and Tourism in 2007. In 2008, Eduardo Paes was elected Mayor of Rio de Janeiro. He has since created numerous urban initiatives that include Porto Maravilha (revitalisation of the port area), Morar Carioca (urbanisation of all the favelas), UPP Social (development of social programmes in pacified favelas), and the Rio Operations Center (a nerve centre that monitors all municipal logistics).**